REMARKS

Claims 1-28 are pending in the application. The Examiner is thanked for indicating the allowability of claims 6-7 and 17-18. Claims 1, 5, 8, 11, 13, 20-24 and 26-28 have been amended. In view of the following, it is respectfully submitted that all of the currently unallowed claims are in condition for allowance.

Objection to the Specification

The Examiner has objected to the specification on the basis of an alleged failure to teach the limitation "a carrier signal having the first frequency and an information signal having a third frequency that is significantly lower than the first frequency" recited in claim 12.

Referring, *e.g.*, to paragraph 32 of the specification states that an "input voltage signal $V_{in,RF}$ is a modulated radio-frequency (RF) signal, oscillating at a frequency f_{RF}". It is respectfully submitted to be inherent to the frequency modulation technique that a signal (the carrier) at a higher frequency (the first frequency, in the language of the claim) is modulated by a signal (the signal carrying the information content, *i.e.* the information signal) oscillating at a much lower frequency (the third frequency, in the language of the claim). Thus, it is further submitted that the specification provides ample support for the claimed limitation.

Rejection of Claims 5-7 and 12 Under 35 U.S.C. 112

Claims 5-7

Claim 5 has been amended. Accordingly, claims 5-7 now stand in condition for allowance.

Claim 12

Claim 12 complies with the enablement requirement for the reasons discussed above. Accordingly, the Examiner is respectfully requested to withdraw this rejection.

Rejection of Claims 1-5, 8-11, 13-16 and 19-28 Under 35 U.S.C. 102(b) As Being Anticipated By Wang

Claim 1

Claim 1 as amended recites an analog multiplier for multiplying a first analog voltage signal at a first frequency by a second analog voltage signal at a second frequency, comprising a first stage for converting the first analog voltage signal into a first and a second current signals; a second stage comprising a first and a second cross-coupled current-switching pairs, driven by the second voltage signal, said first and second current-switching pairs having respective current inputs for receiving the first and the second current signals, respectively; parasitic capacitances associated with each of said current inputs of the current-switching pairs; and a compensation circuit coupled to the current inputs of the current-switching pairs for compensating said parasitic capacitances at said first frequency.

For example, referring, *e.g.*, to FIGS. 1-4 and paragraphs 30-44 of the present application, an active mixer 100 comprises a first stage, or input stage 105, and a second stage, or output stage 110. An LC filter 125 is coupled to common source nodes S1 and S2. The LC filter 125 may be a "T" filter, comprising a first and a second inductors L1 and L2, with a first terminal connected to the common source nodes S1 and S2, respectively, and a second terminal connected to a first plate of a capacitor C, having a second plate connected to the ground GND.The filter 125 acts as a parallel resonator for differential signals at a parallel resonance frequency. The filter 125 acts as a series resonator for common-mode signals at a series resonance frequency fs. By sizing the inductance L of both the inductors L1 and L2 so that the parallel resonance frequency fp is equal to fRF (the frequency of the radio-frequency input signal), the parallel resonance of the filter 125 causes parasitic capacitances Cpar,1 and Cpar,2 to be cancelled, thereby improving the mixer performance in terms of linearity.

Wang, on the other hand, fails to teach the limitations of claim 1. Wang discloses (col. 3, lines 6 and following) a first reactance circuit (capacitor 34 and inductor 36) and a second reactance circuit (capacitor 38 and inductor 40). Each of the first and second reactance circuits provides a low impedance to ground at the

second harmonic of the second input signal (i.e. the local oscillator signal) and a high impedance at the frequency of the first input signal (a radio frequency signal). In such a way, second harmonics of the local oscillator signal are eliminated or, at least, greatly reduced, while a radio frequency input signal is not affected to any meaningful extent. The reactance circuits of Wang do not, however, compensate parasitic capacitances at the frequency of the radio frequency input signal. In the teachings of Wang, no such compensation of parasitic capacitances at the frequency of the radio frequency input signal takes place: in fact, at such a frequency the reactance circuits offer a high impedance, so as not to affect the input signal itself.

Claim 8

Claim 8 is patentable for reasons similar to those discussed above in connection with claim 1.

Claim 2-7 and 9-10

Claim 2-7 and 9-10 are patentable by virtue of their respective dependencies from claims 1 and 8.

Claim 11

Claim 11 as amended recites an input stage having an output node and operable to receive an input signal having a first frequency; an output stage having an input node coupled to the output node and operable to receive a mixing signal having a second frequency; and a filter coupled to the output node and at the first frequency is operable to function as a tank circuit having a parallel resonant frequency that is substantially equal to the first frequency, and at a harmonic of the second frequency is operable to function as a tank circuit having a series resonant frequency substantially equal to the harmonic of the second frequency.

In contrast, Wang fails to teach or suggest a filter coupled to an output node and that, at a first frequency, is operable to function as a tank circuit having a parallel resonant frequency that is substantially equal to the first frequency, and at a harmonic

of a second frequency is operable to function as a tank circuit having a series resonant frequency substantially equal to the harmonic of the second frequency.

<u>Claims 20-21, 24 and 26</u>

Claims 20-21, 24 and 26 are patentable for reasons similar to those discussed above in connection with claim 11.

<u>Claim 13</u>

Claim 13 as amended recites a filter comprising an inductance directly coupling between differential output nodes and a capacitor coupled between the inductance and ground.

In contrast, Wang fails to teach or suggest a filter comprising an inductance directly coupling differential output nodes and a capacitor coupled between the inductance and ground.

<u>Claims 12, 14-19, 22-23, 25 and 27-29</u>

Claims 12, 14-19, 22-23, 25 and 27-29 are patentable by virtue of their respective dependencies from claims 11, 13, 21, 24 and 26.

CONCLUSION

In view of the foregoing, Applicants believe that all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes that a telephone conference would expedite prosecution of this application, please telephone the undersigned at (425) 455-5575. **If the Examiner does not agree that all pending claims are in condition for allowance, the Examiner is respectfully**

requested to contact the undersigned to arrange a discussion of the application prior to issuing an Office action.

Respectfully submitted,
GRAYBEAL JACKSON HALEY LLP

Date: July 12, 2005

P.G. Scott Born
Registration No. 40,523
155 - 108th Avenue N.E., Suite 350
Bellevue, WA 98004-5901
(425) 455-5575